

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

Power Integrations, Inc.,

NO. C 09-05235 JW

Plaintiff,

**SECOND CLAIM CONSTRUCTION
ORDER**

v.

Fairchild Semiconductor Int'l, Inc., et al.,

Defendants.

I. INTRODUCTION

In a counterclaim in this action, Defendants and Counterclaimants Fairchild Semiconductor International, Inc., Fairchild Semiconductor Corporation and System General Corporation (“SG”) (collectively, “Defendants”) allege that Plaintiff and Counterdefendant Power Integrations, Inc. infringes Fairchild’s U.S. Patent No. 5,747,977 (the “’977 Patent”). On March 24, 2011, the Court conducted a Claim Construction hearing to consider disputes between the parties over various language of the patents-in-suit. On July 13, 2011, the Court issued its First Claim Construction Order.¹ This Second Claim Construction Order gives the Court’s construction of disputed language in the ‘977 Patent.

¹ In its First Claim Construction Order, the Court construed the disputed words and phrases in the other two patents at issue in this case—U.S. Patent No. 6,212,079 and 6,538,908—both of which were placed in suit by Plaintiff. (hereafter, “July 13 Order,” Docket Item No. 128.) The Court’s First Claim Construction Order also provides a discussion of the procedural history in this case and the legal standards and procedures used by the Court in claim construction, which are also applicable to this Claim Construction Order. (See id. at 2-5.)

II. DISCUSSION

A. The '977 Patent

The '977 Patent is entitled "Switching Regulator Having Low Power Mode Responsive to Load Power Consumption."

The Abstract of the '977 Patent describes the invention as follows:

A switching mode power converter monitors the level of power supplied to a load device. The operation of a switch is controlled and used to draw power from an input source and supply power to the load device. During normal operation, the operation of the switch is triggered on every clock pulse by a triggering pulse. The duty cycle of the triggering pulse is controlled by a pulse width modulation circuit which monitors the level of power being supplied to the load device. When the power being supplied to the load falls to a predetermined light load threshold level, representing that the load device is either in a standby mode or a period of light use, the switching mode power converter will reduce the amount of power being drawn from the input source by disabling the triggering pulse for an appropriate number of pulses of the clock signal. The number of pulses skipped will depend on an amount of power being supplied to the load device and an amount of voltage stored across the capacitor. The triggering pulse is re-enabled once the power being supplied to the load device rises above the light load threshold level or the voltage stored across the capacitor falls to a low threshold level. In this manner, during periods when the load device is not operating in the continuous conduction mode, the switching mode power converter will attempt to minimize the amount of power being drawn from the input source.

B. Claim 6 of the '977 Patent

Claim 6 of the '977 Patent provides:²

A method of supplying power to a load device comprising the steps of:

- (a) drawing power from an input source including alternately charging an **inductor** with a current and discharging the inductor into a storage device for forming a voltage;
- (b) **forming an error signal representative difference between the voltage and a desired voltage;**
- (c) delivering the voltage stored on the storage device to a load device;
- (d) monitoring the voltage and the error signal;
- (e) **comparing the error signal to a ramp signal for controlling a duty cycle** for alternately charging the inductor and discharging the inductor;

² Disputed words and phrases are in bold type.

(f) **disabling the step of drawing power from the input source when the error signal falls below a light load threshold level and the voltage stored by the storage device exceeds a high threshold level;** and

(g) re-enabling the step of drawing power from the input source when either the error signal rises above the light load threshold level or the voltage stored by the storage device falls below a low threshold level.

Claim 6 is a process claim that discloses a method for supplying power to a load device. The steps in the method each recite a structural element (i.e., drawing power, forming an error signal, delivering the voltage, monitoring the voltage, comparing the error signal, and disabling the step of drawing power). Whether structural recitations limit a claim depends on the language of the claim and the other intrinsic evidence. See *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 1271 (Fed. Cir. 1986).

1. “inductor”

The “drawing power” step of the method disclosed in Claim 6 of the ‘977 Patent recites: “drawing power from an input source including alternately charging an **inductor** with a current and discharging the inductor into a storage device for forming a voltage.”

The parties dispute the meaning of the word “inductor.”³

The inventor did not include an express definition of the word “inductor” in either the Claim or the written description. In his recitation of the “Background of the Invention,” the inventor discusses the phrase “inductor current” as follows: “[t]he output voltage is established by integrating the inductor current in the LC filter network” and “[t]he inductor current is stored as a voltage level on the plates of the capacitor when the switch is open.” (‘977 Patent, Col. 1:43-44, 60-62.) An “inductor” is a common term; it is an electrical device. With respect to electrical circuits, an “inductor” generally refers to a device consisting of one or more associated windings, with or

³ The Court notes that the “drawing power” step includes the step of “drawing power” and two sub-steps: “alternately charging an inductor” and “discharging the inductor.” The parties have not tendered the meaning of “drawing power” or the meaning of the sub-steps for construction. They have only tendered for construction the meaning of “inductor,” which is a device used in performing the sub-steps.

without a magnetic core, for introducing inductance into an electric circuit.⁴ “Inductance” is commonly understood to mean the property of generating voltage proportional to the rate of change in current in a circuit.⁵ In further discussion of the term “inductor,” the written description describes an inductor having a “first terminal” and a “second terminal.” (‘977 Patent, Col. 4:44-49.)

Accordingly, the Court construes the term “inductor,” as used in Claim 6 of the ‘977 Patent, to mean:

A coil device with a first terminal and a second terminal that introduces inductance when connected to an electrical circuit.

2. “forming error signal representative difference between the voltage and a desired voltage”

In the “forming” step, the parties dispute the meaning of the phrase “error signal representative difference between the voltage and a desired voltage.”⁶

During prosecution of the ‘977 Patent, the patentee referred to this phrase to distinguish the invention from prior art by claiming that an error signal *is* “a difference between the output voltage

⁴ See INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) DICTIONARY OF STANDARD TERMS 551 (7th ed. 2000)

⁵ (See Declaration of Jeremy T. Elman in Support of Defendants’ and Counterclaimants’ Opening Claim Construction Brief, hereafter, “Elman ‘977 Decl.,” Ex. 3, The IEEE Standard Dictionary of Electrical and Electronics Terms at 640 (5th ed. 1993) (an inductor is a “device consisting of one or more associated windings, with or without a core, for introducing inductance into an electrical circuit”), Docket Item No. 108-3; Declaration of Michael R. Headley in Support of Power Integrations’ Answering Claim Construction Brief Regarding U.S. Patent No. 5,747,977, hereafter, “Headley ‘977 Decl.,” Ex. C, The Penguin Dictionary of Electronics at 264 (2d ed. 1988) (an inductor is a “device or circuit element, usually in the form of a coil, that possesses inductance and is used primarily because of that property”), Docket Item No. 115-3.)

⁶ During the hearing, Defendants introduced evidence that the ‘977 Patent was issued with a typographical error in the language of Claim 6, namely that “an error signal representative difference” was meant to read “an error signal representative *of a* difference.” The Court finds that it can construe the claim term independent of whether the ‘977 Patent was issued with an error based on the language in the specification. As a result, the Court declines to correct any purported error in the claim language.

1 and a desired output voltage.”⁷ The written description states that “a portion of the voltage across
2 the load device is measured by the potentiometer and input into the error amplifier.” (‘977 Patent,
3 Col. 5:36-38.) The error amplifier “compares the voltage output from the potentiometer with the
4 reference voltage” and outputs “the difference between the two inputs multiplied by the gain of the
5 error amplifier.” (‘977 Patent, Col. 5:38-41.)

6 The Court finds that the “error signal representative difference” is not a signal that *indicates*
7 that there is a difference between two voltages that are “forming” during this step. Rather, the “error
8 signal representative difference” is a signal the value of which *is* the difference. It is a
9 “representative” difference because it is amplified. (‘977 Patent, Col. 5:41.)

10 Accordingly, the Court construes “forming an error signal representative difference between
11 the voltage and a desired voltage,” as used in Claim 6 of the ‘977 Patent, to mean:

12 **generating an error signal by amplifying the difference between an output voltage and**
13 **a desired voltage of the circuit.**

14 **3. “comparing the error signal to a ramp signal for controlling a duty cycle”**

15 A further step in the method disclosed in Claim 6 is the “comparing” step: “comparing the
16 error signal to a ramp signal for controlling a duty cycle for alternately charging the inductor and
17 discharging the inductor.” The parties dispute the meaning of all of the words and phrases in the
18 comparing step.

19 As an initial matter, the “error signal” that is operated on in the “comparing” step is the
20 “error signal” that is generated during the “forming” step. (See ‘977 Patent, Col. 5:42-44 (the output
21 from the error amplifier is compared to the modulating ramp reference signal by a comparator).)
22 The “ramp signal” is the “modulating ramp signal” that is an output of an oscillator. (‘977 Patent,
23 Col. 4:62.) Figure 2 of the ‘977 Patent illustrates “comparing” the “error signal” to “the modulating
24 ramp signal of the oscillator.” Figure 2 is a graph of the “modulating ramp signal” that shows a
25 voltage wave form that increases and decreases over time between a maximum and minimum value

26 ⁷ (Elman ‘977 Decl., Ex. 4, Prosecution History of U.S. Patent Application 08/413,249,
27 Docket Item No. 113-6; Headley ‘977 Decl., Ex. H, February 24, 1997 Amendment and Response to
28 December 24, 1996 Office Action at 7, Docket Item No. 115-8.)

1 in a set repeating fashion. (See '977 Patent, Figure 2, Col. 2:17-24.) "The duty cycle of the
2 triggering pulse voltage and thereby of the switch" is determined by comparing "the level of the
3 output of the error amplifier [with] the level of the modulating ramp signal." ('977 Patent, Col.
4 5:67-6:3.)

5 The phrase "for controlling a duty cycle" would be understood by a person of ordinary skill
6 in the art to be a functional description of the purpose of the "comparing step." The "duty cycle" is
7 the "on-time" of the switch. (See '977 Patent, Col. 2:43-44 ("The effective duty cycle of the trailing
8 edge modulation is determined during the on time of the switch").)

9 Accordingly, as used in Claim 6 of the '977 Patent, the Court construes "comparing the error
10 signal to a ramp signal for controlling a duty cycle" to mean:

11 **controlling the duty cycle of the switch by comparing the error signal with an output**
12 **voltage signal from an oscillator that increases and decreases over time between a**
13 **maximum and a minimum value in a set repeating fashion.**

14 **4. "disabling the step of drawing power from the input source when the error**
15 **signal falls below a light load threshold level and the voltage stored by the**
16 **storage device exceeds a high threshold level"**

17 A further step in the method disclosed in Claim 6 is the "disabling" step: "disabling the step
18 of drawing power from the input source when the error signal falls below a light load threshold level
19 and the voltage stored by the storage device exceeds a high threshold level." The parties dispute the
20 meaning of the word "disabling."

21 Inventors frequently use present participle verbs to disclose steps in a method claim. The
22 meaning of the present participle "disabling" can be derived from claim language that discloses what
23 the step is disabling and when the step commences operation. The language of Claim 6 discloses on
24 what the "disabling" step is operating: "the step of drawing power." The language of Claim 6 also
25 discloses when the "disabling" step operates: "when the error signal falls below a light load
26 threshold level and the voltage stored by the storage device exceeds a high threshold level."

27 Throughout the written description, the patentee discusses "disabling" the trigger pulse as a
28 episodic event that lasts until some other event triggers a different condition:

When the power being supplied to the load falls to a predetermined light load threshold level, representing that the load device is either in a standby mode or a period of light use, the switching mode power converter will reduce the amount of power being drawn from the input source by **disabling the triggering pulse for an appropriate number of pulses of the clock signal**. The number of pulses skipped will depend on an amount of power being supplied to the load device and an amount of voltage stored across the capacitor. **The triggering pulse is re-enabled once the power being supplied to the load device rises above the light load threshold level or the voltage stored across the capacitor falls to a low threshold level**. In this manner, during periods when the load device is not operating in the continuous conduction mode, the switching mode power converter will attempt to minimize the amount of power being drawn from the input source.

(‘977 Patent, Col. 3:17-33.) A person of ordinary skill in the art would understand that “disabling” is a temporary suspension of a triggering signal under disclosed conditions.

Accordingly, as used in Claim 6 of the ‘977 Patent, the Court construes “disabling the step of drawing power from the input source when the error signal falls below a light load threshold level and the voltage stored by the storage device exceeds a high threshold level” to mean:


suspending the switching action under preselected conditions.

III. CONCLUSION

In this Order, the Court has given its construction of submitted words and phrases of the ‘977 Patent.

The parties shall appear for the Case Management Conference previously set for **September 19, 2011 at 10 a.m.**

Dated: August 30, 2011


 JAMES WARE
 United States District Chief Judge

1 **THIS IS TO CERTIFY THAT COPIES OF THIS ORDER HAVE BEEN DELIVERED TO:**

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8 **Dated: August 30, 2011**

Richard W. Wieking, Clerk

9 **By: /s/ JW Chambers**
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